

**Summary of Responsibilities and Procedures for ESRL Staff**  
*Supporting Joint HMT-West / CalWater 2011 Field Operations*

*Red text indicates notes and items with required follow-up*

**Overview and Background**

This document provides a description of daily operations during HMT-West 2011 and is intended primarily to guide NOAA ESRL personnel roles and responsibilities. It also serves to communicate with the broader CalWater science team and to foster coordinated field operations that will involve aircraft (DOE) and ground-based aerosol (primarily USCD/Scripps) observations specifically for CalWater from 1 February – 7 March 2011 (described in more detail below).

The HMT-West 2011 field season will operate from 1 December 2010 – 15 March 2011 with a break from 22-27 December. The field season will consist of Intensive Operations Periods (IOPs) during which NOAA personnel will launch upper air soundings (6-8X/day) and operate the NOAA SkyWater C-band radar.

The 2011 field season represents a unique deployment, due to significant contributions to the existing HMT-West infrastructure from the California Energy Commission (CEC) and the California Department of Water Resources (CADWR). The CEC is building on the existing HMT-West instrumentation network through CalWater (<http://www.esrl.noaa.gov/psd/calwater/>), a program complementary to HMT-West that aims to examine the role of aerosols in precipitation as well as to quantify the temporal and spatial variability of atmospheric rivers (ARs) and their representation in climate models. These objectives involve specialized monitoring of the Sierra Barrier Jet (SBJ), which profoundly affects transports of both water vapor and aerosols, and ultimately redistributes orographic precipitation and modifies AR conditions (each of importance to HMT). CalWater (through joint sponsorship from CEC, HMT and PSD) is contributing to the deployment a number of assets that will be used in the 2011 field season, including:

- SkyWater C-band radar deployment;
- Supplemental upper air soundings at Lincoln;
- S-band precipitation profilers (S-profs) at Sugar Pine and Mariposa;
- Atmospheric River Observatory (ARO)/wind profiler at Concord;
- GPS-met observations at Fort Bragg and Shasta; and
- ARO displays, including model inputs, added to several HMT-West profiler sites

In addition, CADWR is contributing to the legacy of HMT-West through enhancements to existing HMT-West instrumentation as well as through deployment of new instrumentation sites in California. CADWR contributions include:

- four snow level radars (i.e., Shasta Dam, Colfax, Pine Flat Reservoir, New Exchequer Dam);
- 15 new GPS-met sites already installed in northern California and 8 additional sites to be deployed during the 2011 field season; and
- 8 existing and pending soil moisture sites in northern and central California.

Although the CEC CalWater contributions listed above extend over the entire 1 December – 15 March period, the season includes an approximate 5-week period (1 February – 7 March) with an added emphasis on CalWater aerosol (AP) activities. Therefore, to minimize confusion, this document is divided into sections reflecting the emphasis during the two different time periods. The period of joint operations from 1 December – 31 January and 8 March – 15 March is referred to as the “**AR Period**” to indicate preferential sampling of ARs and the Sierra Barrier Jet and resulting effects on precipitation. Roles and responsibilities of ESRL during these time periods are described in Sections II and III. The period of operations from 1 February – 7 March is referred to as the “**AR-AP Period**” to reflect the combined emphasis of HMT-West and CalWater on ARs and CalWater on AP. Roles and responsibilities of ESRL personnel during this 5 week period are described in Sections IV and V.

The daily operations and field deployment decisions for ESRL personnel will be coordinated by the *HMT Operations Director*. During the AR-AP Period, it is anticipated that CalWater will have designated personnel to coordinate both aircraft operations and ground-based aerosol sampling activities. In this document, these personnel are referred to as the *Aircraft Operations Director* and the *Aerosol Operations Director*, respectively.

### I. Schedule Information

#### a. HMT Operations Director Schedule

Date	HMT Operations Director
1 December – 2 December	D. Kingsmill
3 December – 12 December	R. Cifelli
13 December – 21 December	D. Kingsmill
26 December – 11 January	A. White
12 January – 26 January	R. Cifelli
27 January – 10 February	A. White
11 February – 22 February	D. Kingsmill
23 February – 27 February	G. Wick
28 February – 2 March	D. Kingsmill
3 March – 15 March	G. Wick

\* Daily calls begin on 1 December. There will be a break from 22-25 December

#### b. Radar and Sounding Deployment Team Schedule

Date	Deployment Team	Deployment Strategy
1 December – 10 December	K. Clark and S. Abbott	Boulder-based
11 December – 21 December	B. Bartram and J. Jordan	Boulder-based
28 December – 11 January	D. Hazen and T. Ayers	Boulder-based
12 January – 26 January	K. Clark – S. Abbott	Boulder-based
27 January – 10 February	B. Bartram and C. Campbell	Boulder-based transitioning to Lincoln-based
11 February – 25 February	D. Hazen and T. Ayers	Lincoln-based
26 February – 15 March	K. Clark and C. Campbell	Lincoln based transitioning to Boulder-based

\* Boulder-based deployment is the “normal” HMT mode of operation

\* Lincoln-based deployment requires field staff to remain in Lincoln during periods of active or uncertain weather. During periods of extended clear weather, the crew may be returned to Boulder

#### c. Forecast Team Schedule

Date	Forecaster
1 December – 7 December	E. Szoke
8 December – 13 December	E. Szoke
14 December – 21 December	J. Brown
26 December – 27 December	P. Nieman
28 December – 4 January	J. Brown
5 January – 10 January	E. Szoke
11 January – 17 January	S. Albers
18 January – 22 January	E. Szoke

23 January -30 January	D. Birkenheuer
31 January	E. Szoke
1 February – 15 March Need to flesh out the details for this period (Paul, Ben, Rob)	P. Neiman and B. Moore ( <i>Ed Szoke can sub later as needed</i> )

## II. Daily Routine During the AR Period (1 December – 31 January and 8 March – 15 March)

- a. *Forecasts:* The daily routine will consist of a forecast for current and upcoming weather over the HMT-West domain. The discussion will include anticipated onset of precipitation at the Cazadero and Shasta Dam sites, when appropriate. This information will be used by the Operations Director to guide the isotope sampling described below in Sec. IIIc. The forecast will be posted to the HMT-West forecast blog ([http://hmt.noaa.gov/field\\_programs/hmt-west/2011/forecasts/](http://hmt.noaa.gov/field_programs/hmt-west/2011/forecasts/)) between ~11:00-12:00 pm MST every day, including weekends. The forecaster is responsible for posting the forecast via the blog administration page ([http://hmt.noaa.gov/field\\_programs/hmt-west/2011/forecasts/wp-admin](http://hmt.noaa.gov/field_programs/hmt-west/2011/forecasts/wp-admin)). R. Cifelli will send out the user name and password to the Forecasters prior to 1 December.
- b. *Conference Calls:* Daily calls will be held at 12:30 pm MST and will be facilitated by the HMT Operations Director. The main purpose of the call is to discuss the weather outlook and determine whether to declare an IOP. During periods of clear, stable weather, the calls will be short (< 10 minutes). During periods when precipitation is forecast or is occurring, the calls will be longer since decision regarding timing of deployments need to be considered. At a minimum, the HMT Operations Director, Forecaster, and Radar-Sounding Deployment Team should participate in the daily calls. On weekends when no significant weather is occurring or is anticipated for an extended period, the forecaster may choose to not participate in the daily call. However, the designated forecaster will continue to post the weather outlook on the forecast blog, as described above in Sec. IIa. When declaring an IOP, the HMT Operations Director needs to consider travel logistics for the deployment crew. A minimum of 36 hours should be used as a baseline to notify personnel of the need to travel to the Lincoln field site so that the appropriate travel documents can be obtained.
  - i. Call information: The daily calls will use the following number and access code:  
Phone: 1-866-732-5980  
Passcode: 7247921
- c. *Project Status:* The Project Status blog ([http://hmt.noaa.gov/field\\_programs/hmt-west/2011/status/](http://hmt.noaa.gov/field_programs/hmt-west/2011/status/)) will be updated by the HMT Operations Director by ~ 2:00 pm to report anything noteworthy regarding the status of the project (e.g., instrument sites that are not reporting data, decisions regarding IOPs, etc). The Project Status blog can be updated via the blog administration page ([http://hmt.noaa.gov/field\\_programs/hmt-west/2011/status/wp-admin](http://hmt.noaa.gov/field_programs/hmt-west/2011/status/wp-admin)). Information regarding the status of the WRF ensemble members, computer resource availability, etc., will be added to the Project Status blog by Isidora Jankov on an as needed basis. R. Cifelli will send out the user name and password to the Operations Directors prior to 1 December.

## III. Responsibilities During AR Period IOPs (1 December – 31 January and 8 March – 15 March)

- a. *Soundings:* The deployment crew will launch sondes 6-8x/day during an IOP. The procedure for launching balloons and saving the data in output files is specified in the

sounding procedure manual. The exact number of sondes per day will be determined by the HMT Operations Director and will be communicated to the deployment crew via the daily call. For 8x/day, sondes will be launched at 3 hour intervals: 00Z(16L), 03Z(19L), 06Z(22L), 09Z(01L), 12Z(04L), 15Z(07L), 18Z(10L), 21Z(13L). For 6x/day, sondes will be launched at 4 hour intervals: 00Z(16L), 04Z(20L), 08Z(00L), 12Z(04L), 16Z(08L), 20Z(12L). The goal will be to launch sondes coinciding roughly with the onset of precipitation and ending shortly after the passage of the cold front at the Lincoln radar site. The exact timing will be communicated during the daily call. Notes for sonde launches:

- i. Watch out for wasps in He caps
  - ii. *Sonde releases occur one hour earlier than times listed above (e.g. 12Z sonde releases at 11Z).*
  - iii. *If sonde reaches 700 mb or higher no re-launch is needed (if sonde does not reach 700 mb, then do another release)*
  - iv. *If balloon porpoises, we do not want to send the data - > terminate the sonde and re-launch with more He in the balloon. (porpoising sondes should fail quickly).*
  - v. *Do not launch one within 2 hours of next scheduled launch to avoid multiple sonde tracking (we can modify this policy later as needed). Note, if you intend to launch another sonde while a previous sonde is still transmitting you must change frequencies.*
  - vi. *Fill out a log sheet for each launch*
- b. **Radar:** The deployment crew will operate the SkyWater radar during an IOP. The scan strategy is described in the radar operations manual. During radar operations, it will be desirable to scan SkyWater in a manner that parallels the scan strategy of the KDAX NEXRAD in Davis. The scan strategy will usually be "VCP12"; however, if KDAX changes the VCP mode, the deployment crew should change the scan strategy of SkyWater accordingly. Procedures for keeping track of the KDAX operation mode are described in the radar operations manual.
- i. *If internet goes down and C. Campbell's script cannot provide guidance on KDAX scanning mode, the recommendation is to keep SkyWater in the "default" scan strategy*
- c. **Isotope Water Procedures:** At the start of an IOP, the HMT Operations Director will be responsible for initiating the collection of water isotopes at the Cazadero and possibly Shasta Dam sites according to the procedures outlined in Appendix A. A. White and P. Neiman will be available to the Operations Director for consultation regarding decisions to initiate the isotope water collection process.
- d. **IOP Summaries:** Subsequent to the completion of an IOP, the HMT Operations Director will be responsible for providing a summary of the IOP and posting the summary to the Operations Summary blog ([http://hmt.noaa.gov/field\\_programs/hmt-west/2011/ops/](http://hmt.noaa.gov/field_programs/hmt-west/2011/ops/)). IOP summaries will be labeled sequentially, starting with "1" and the file names will follow the convention "hmtwest\_2011\_iopnumber\_summary.pdf". The Operations Summary blog can be updated via the blog administration page ([http://hmt.noaa.gov/field\\_programs/hmt-west/2011/ops/wp-admin](http://hmt.noaa.gov/field_programs/hmt-west/2011/ops/wp-admin)). R. Cifelli will send out the user name and password to the Operations Directors prior to 1 December.
- e. *Be careful of wasps in porta potty and around radar trailer*

#### **IV. Daily Routine During the AR-AP Period (1 February – 7 March)**

- a. *Forecasts:* During the CalWater period, the forecaster will have both HMT-West and CalWater forecast responsibilities. The HMT-West responsibilities will be the same as described above in Sec. IIa. The forecaster will also need to communicate with the appropriate CalWater team member(s) in the mornings (0745 LT) of scheduled CalWater aircraft flights to help inform flight operations (go no-go decisions). These communications will occur through a GoTo Meeting-like venue and the forecaster may choose to use visual graphics if deemed appropriate. *These calls are anticipated to be short.*

The daily conference call will be conducted through a GoTo meeting format. The forecaster will prepare a power point presentation of visual graphics to facilitate the forecast discussion. This power point file will be posted on the forecast blog. During the call, the forecaster will attempt to provide relevant information on fog, near surface winds, icing or turbulence associated with cross barrier flow that may impact either flight or mobile aerosol operations. It is recognized that the forecaster can only provide general information on these topics. The forecaster will also provide anticipated start/stop times of precipitation and freezing level information at the Sugar Pine site and for the mobile system, when appropriate. This information will be posted on the forecast blog and may be discussed during the daily HMT-West conference call. The information will be used by the CalWater team to help guide decisions regarding aerosol and isotope sampling at these sites.

- i. *HMT Operations Director needs to consider crew safety issues during low snow level events at Sugar Pine*
- b. *Conference Calls:* As noted above in Sec. IVa, daily conference calls will be conducted during the CalWater period using a GoTo Meeting format (Rob Cifelli will send around the call-in/web information to the HMT-CalWater community in January). The HMT Operations Director will facilitate the daily call and, for the most part, the daily calls will be run similar to the procedure described above in Sec. IIb. During the CalWater period, it is anticipated that members of the CalWater team will participate in the conference calls (J. Comstock, K. Prather, Beat Schmid, possibly others). During the call, the CalWater team or the HMT forecaster will inform the HMT-West Operations Director regarding the status of aircraft operations and any other relevant CalWater deployments.
  - i. *HMT Operations Directors and forecasters during the 1 February – 7 March period will be added to the CalWater email list and have access to the CalWater Wiki page. These email/Wiki page will be used to update the status of CalWater activities.*
- c. *Project Status:* The HMT Operations Director will update the Project Status blog, similar to the procedures described above in Sec. IIc. In addition to HMT-West, relevant information regarding CalWater operations will be noted in the Project Status blog (e.g., aircraft operations, mobile aerosol operations, etc).

#### **V. IOP Responsibilities During the AR-AP Period (1 February – 7 March)**

- a. *Soundings:* The deployment crew will launch sondes similar to the procedures described above in Sec. IIIa. However, in addition to sampling during precipitation, CalWater operations will necessitate launching sondes well ahead and after the passage of a precipitation event. Therefore, it will be necessary for the deployment crew to be stationed in Lincoln, CA during the HMT-West/CalWater-AR-AP period. The exact requirement for launching sondes ahead and after a precipitation is TBD.

- i. Had 100 sondes; used 2; currently have 98 for start of field season (1 December)*
  - ii. Will order 45 (20 more for this year/ 25 for next – Clark will order)*
  - iii. B. Bartram is looking into who needs to be alerted that a launch occurred or is imminent –no FAA requirements but may be other people/organizations that should be “advised” of a launch*
- b. *Radar:* The deployment crew will operate the SkyWater radar during an IOP similar to the procedures described in Sec. IIIb.
- c. *Isotope Water Procedures:* The Operations Director will initiate the collection of water isotopes similar to the procedure described in Sec. IIIc.
- d. *IOP Summaries [based on discussions with aerosol/aircraft leads]:*

During the 1 February – 7 March time period, some IOPs will have both AR and AP activities; whereas others will have AP-only activities. Subsequent to the completion of an AR-AP IOP, the HMT Operations Director will be responsible for providing a summary of the IOP from AR perspective, similar to the procedure described above in Sec. III d. A separate summary will need to be written to reflect the AP activity focus. Presumably, this summary will be provided by the Flight Operations Director or the CalWater Aerosol Director. The flight-aerosol summaries will be posted to the CalWater wiki site: <https://wiki.arm.gov> (access to the site requires a password that will be provided to HMT personnel). To eliminate confusion with IOPs conducted during the period prior to 1 February and to facilitate cross-referencing of activities, the AR and AP summary nomenclature will be synchronized. For aircraft flights that occur during an HMT-West IOP, the aircraft summary would be designated as:

**YYYYMMDDa\_IOP# or YYYYMMDDb\_IOP#**

where the "a" denotes flight "a" or "b" for the first or second flight on a give day. The IOP# would be the number for the HMT-West IOP. For example, if HMT-West were conducting IOP 6 on February 5-7th, aircraft summaries would be named:

**20110205a\_IOP6**

**20110205b\_IOP6**

**20110207a\_IOP6**

**20110207b\_IOP6**

for flights on 5 and 7 February, respectively. For G-1 flights occurring when there is no HMT-West IOP, the flight summaries would be labeled as:

**YYYYMMDDa or YYYYMMDDb**

A similar naming convention is envisioned for ground aerosol operation summaries.

### Appendix A – Isotope Procedures

**Steps in coordinating water collection for chemical/isotopic analysis. For the 2010/11 winter season, UCSD students will be starting the collector at Sugar Pine during the CalWater field campaign (Feb 1 – Mar 7, 2011). The HMT forecast/IOP blog should indicate guidance for when the collector should be started. HMT Ops Directors will be starting the collectors at Cazadeo and possibly at Shasta Dam during the HMT period (Dec 1, 2010 – mid March 2011) via telephone calls to the sites.**

\*Paul Neiman wants to stay in the collection loop

\* We need to define collection requirements

1. Determine if water collection should occur for a given precipitation event impacting the HMT-West coastal and Sierra Nevada domains. Ty Coplen says that we are not restricted by analysis cost, but he also says that we should focus on the bigger events. Maybe use a ~2" storm accumulation threshold instead of our usual ~1" threshold for IOP's. Paul Neiman (x6621) and/or Allen White (x5155) are also available for consultation.

2. If collection is desired, make an estimate of event duration and precipitation onset time for each of our sites: Cazadero (CZC), Sugar Pine (SPD), and possibly Shasta Dam (STD). The water collectors can sample for 48 h continuously (96 samples at 30 minute resolution). After 48 h, the collectors need to be replenished with empty vials. We would like to avoid performing this service during nighttime hours and when it is raining at a site; it is difficult to perform the service under these conditions and we also risk contaminating samples and damaging the collector.

3. The collectors at CZC and SPD are turned on remotely via telephone controllers. This controller basically acts as a toggle to start the water collection process. However, once the collector is started remotely, it cannot be turned off remotely, so be careful. Here is the procedure:

a. Dial the number  
CZC 707-847-3408  
STD (Allen W. or Ty C. TBD

b. Wait for 4 or 5 rings and the machine will pick up and respond with 3 beeps

c. Enter 1234 as the access code. It will respond with 2 beeps if no error. One beep means an error has occurred.

d. If you want to determine the status of the controller, press 1. Depending on how the switch box is set up, one beep usually means the controller is set in standby mode. Two beeps means the controller is set in a mode to tell the collector to sample, what we will call the "active" mode. This is a good thing to check before trying to start the sampling, and especially the first time you call to verify that one beep corresponds to standby mode. Ordinarily, the controller should be left by the installers in the standby mode.

e. Assuming the controller is in standby mode, press \* to toggle from standby mode to active mode. This will start the collector.

f. Press # and then 0 to end the session.



- g. VERY IMPORTANT: After a few minutes, dial up again and toggle the controller back to standby mode by pressing \*. This will not stop the collector. However, it will ensure that the collector will not start inadvertently after it has been replenished. Press # and then 0 to end the session.

If problems occur, contact Ty.

Email: [tbcoplen@usgs.gov](mailto:tbcoplen@usgs.gov) or [tbcoplen@gmail.com](mailto:tbcoplen@gmail.com) ; Office: 703-648-5862 ; Cell: 703-489-6125

4. Take note of the day/time when each collector is turned on and when it should complete its 48 h cycle. please use GMT as the time convention to avoid confusion: GMT = MST + 7 hours). Send an email to Ty Coplen, Dave Nelson, and whoever will be the contact at Shasta Dam and with this information. Arrange for the site contact to pick up the rain samples and replenish the collector with empty vials. Try to recommend a daytime period when it will not be raining at a site. If necessary, arrange the service to occur before the end of the current 48 h sampling period to meet these needs (e.g., during a break in precipitation in advance of another round of precipitation that is forecast to start before the current 48 h cycle is complete). Here are the relevant contacts:

CZC            David Nelson  
                 [deevnn@yahoo.com](mailto:deevnn@yahoo.com)  
                 707-431-4260 (office; best number to use)  
                 707-467-8469 (home)  
                 707-481-0988 (cell)

STD            A. White – Ty C. TBD